

Unified Metadata Model for Services (UMM-S)

Best Practices for UMM-S Metadata Authors

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V1.0.0	2018-10-01	Initial release.	Adam Sisco (UAH), Sarah Ramdeen (UAH)

Executive Summary

The Unified Metadata Model for Services (UMM-S) describes web services, software, and tools useful in viewing or manipulating data served by the EOSDIS DAACs. UMM-S metadata will be housed in the Common Metadata Repository (CMR) alongside other UMM profile (UMM-C, UMM-G, UMM-Var, etc.) metadata to support an improved Earth science data user experience. The DAACs have expressed interest in the UMM-S, but little information has been made available on how to curate actual UMM-S elements. Best practices have not been developed to date due to the continuing evolution of the model.

Between June and October 2018, NASA MSFC IMPACT performed a comprehensive review of the Unified Metadata Model for Services (UMM-S), Revision 1.2.0. One of the goals of this comprehensive review was to compile a set of best practices for DAACs to use when creating and maintaining UMM-S metadata in the CMR. This document was written to provide DAACs an initial set of best practices and recommendation for those elements of the model that are most stable. In general, these recommendations pertain to ensuring consistency across UMM-S metadata in the CMR.

NASA MSFC IMPACT has not provided best practices and recommendation for UMM-S concepts still in development. Official UMM-S documentation from the ESDIS Project must first mature before best practices can be formulated and published.

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Purpose

The purpose of this document is to provide UMM-S metadata best practices not offered in other UMM-S documentation. These best practices are meant to assist DAAC metadata authors in writing complete and consistent service metadata records, through which EOSDIS data and services can be made more easily integrable into user workflows.

Scope

The scope of this document is limited to those aspects of the UMM-S that are the most stable. Notably, this document does not offer best practices for the OperationMetadata and ServiceOptions classes found in the UMM-S v1.2 schema. These classes will be fundamental to realizing the end to end services vision but are still actively evolving. As such, best practices for these actively evolving elements are not included in this document.

This document is not meant to be used in isolation. It is intended to be a companion document to the most recent UMM-S documentation distributed by the ESDIS Project. The content of the document in hand is based on UMM-S v1.2. Therefore, the validity of these best practices and recommendations is not guaranteed for subsequent iterations of the model.

Related Documents

Several documents and resources are either referenced in this text or are known to provide supplemental information that may be useful to the reader. They are summarized here.

[1] UMM-S v1.2 documentation

https://wiki.earthdata.nasa.gov/download/attachments/49448405/UMM-S_V1.2_20180530.docx?version=1&modificationDate=1528375678575&api=v2

[2] UMM-S v1.2 schema

<https://git.earthdata.nasa.gov/projects/EMFD/repos/unified-metadata-model/browse/service/v1.2>

[3] Metadata Management Tool (MMT) User's Guide

<https://wiki.earthdata.nasa.gov/display/CMR/Metadata+Management+Tool+%28MMT%29+User+%27s+Guide>

[4] Global Change Master Directory (GCMD) Keywords

<https://wiki.earthdata.nasa.gov/display/CMR/GCMD+Keyword+Access>

[5] GCMD Keywords FAQ

<https://wiki.earthdata.nasa.gov/display/CMR/Keyword+FAQ>

[6] GCMD Keywords Community Forum

<https://wiki.earthdata.nasa.gov/display/gcmdkey/GCMD+Keywords+Community+Forum>

[7] End to End Services Under the Hood (presentation from the 2018 Systems Engineering Technical Interchange Meeting)

<https://eosdissetim2018.sched.com/event/Fuu0/end-to-end-services-under-the-hood>

[8] UMM What? -Services and -Variables Explained (presentation from the 2018 Systems Engineering Technical Interchange Meeting)

<https://eosdissetim2018.sched.com/event/FuuT/umm-what>

[9] OGC Naming Authority Policy Documents

<http://www.opengeospatial.org/standards/na>

[10] Unified Metadata Model for Services (UMM-S): Comments to UMM-S Authors
Link TBD

1 General Considerations for UMM-S Metadata

1.1 Metadata Management Tool for UMM-S record creation

The Metadata Management Tool (MMT) supports the creation of UMM-S records. The [MMT User's Guide](#) provides detailed documentation about the process of managing UMM-S records in the CMR. At the time of this writing, the MMT is not supporting the most current version of UMM-S, v1.2. Metadata authors wanting to leverage the MMT will need to ensure the tool has implemented the UMM-S version the DAAC wishes to use before committing resources to UMM-S record creation. In addition, no auto population solutions are available for UMM-S record creation at this time. Should a DAAC have a use case in which it suspects auto population may be needed, we recommend contacting valerie.dixon@nasa.gov for further discussion.

1.2 Consistency across UMM profiles

The DAAC is solely responsible for managing its metadata both locally and across the various UMM profiles in the CMR. One of the increasingly important aspects of the CMR metadata management lifecycle is maintaining consistency across UMM profiles. For example, DAACs are expected to provide contact information in both UMM-C and UMM-S records. Consistency across a provider's records and across the CMR as a whole increases trust in the data being provided. Thus, DAAC metadata authors will need to formulate and implement processes to ensure UMM metadata is consistent across profiles where applicable.

1.3 GCMD controlled vocabulary elements

UMM-S v1.2 elements that are controlled by the Global Change Master Directory (GCMD) Keyword Management System (KMS) are listed in the table below. Metadata authors needing to submit a keyword request or issue to the GCMD should follow the steps outlined [here](#). Keyword requests can also be submitted via the [GCMD Keywords Community Forum](#).

UMM-S Element	Valid GCMD Keywords
Service/RelatedURLs/Type	URL Content Types
Service/RelatedURLs/Subtype	URL Content Types
Service/ScienceKeywords/Category	Earth Science and Earth Science Services
Service/ScienceKeywords/Topic	Earth Science and Earth Science Services
Service/ScienceKeywords/Term	Earth Science and Earth Science Services
Service/ScienceKeywords/VariableLevel1	Earth Science and Earth Science Services
Service/ScienceKeywords/VariableLevel2	Earth Science and Earth Science Services
Service/ScienceKeywords/VariableLevel3	Earth Science and Earth Science Services
Service/ScienceKeywords/DetailedVariable	Earth Science and Earth Science Services

Service/ServiceKeywords/ServiceCategory	Earth Science and Earth Science Services
Service/ServiceKeywords/ServiceTopic	Earth Science and Earth Science Services
Service/ServiceKeywords/ServiceTerm	Earth Science and Earth Science Services
Service/ServiceKeywords/ServiceSpecificTerm	Earth Science and Earth Science Services
Service/Platforms/ShortName	Platforms/Sources
Service/Platforms/LongName	Platforms/Sources
Service/Platforms/Instruments/ShortName	Instruments/Sensors
Service/Platforms/Instruments/LongName	Instruments/Sensors
Service/ServiceOrganizations/ShortName	Data Centers
Service/ServiceOrganizations/LongName	Data Centers
Service/ServiceOrganizations/ContactPersons/ContactInformation/RelatedURLs/Type	URL Content Types
Service/ServiceOrganizations/ContactPersons/ContactInformation/RelatedURLs/Subtype	URL Content Types
Service/ServiceOrganizations/ContactGroups/ContactInformation/RelatedURLs/Type	URL Content Types
Service/ServiceOrganizations/ContactGroups/ContactInformation/RelatedURLs/Subtype	URL Content Types
Service/ServiceOrganizations/ContactInformation/RelatedURLs/Type	URL Content Types
Service/ServiceOrganizations/ContactInformation/RelatedURLs/Subtype	URL Content Types
ContactPersons/ContactInformation/RelatedURLs/Type	URL Content Types
ContactPersons/ContactInformation/RelatedURLs/Subtype	URL Content Types
ContactGroups/ContactInformation/RelatedURLs/Type	URL Content Types
ContactGroups/ContactInformation/RelatedURLs/Subtype	URL Content Types

1.4 Schema controlled elements

Metadata authors needing information about updates, changes, clarifications, and/or deprecations to the UMM-S schema enumerations should contact support@earthdata.nasa.gov. Inquiries will then be routed to the appropriate personnel.

2 Best Practices for Select UMM-S Elements

2.1 Service/Name

The UMM-S Name element is meant to be the short name, or abbreviated name, of the service, software, or tool. It should mimic the abbreviated syntax of UMM-C short names.

2.2 Service/LongName

The UMM-S LongName element is meant to be the human readable name of the service, software, or tool. This element should make use of proper capitalization and white space to ensure readability.

2.3 Service/Type

The Service/Type element is controlled by a UMM-S schema enumeration. If the desired type is not listed as part of the schema enumeration, we recommend contacting support@earthdata.nasa.gov to inquire whether or not UMM-S supports the desired service type. Valid service types as of UMM-S v1.2 are as follows:

- OPeNDAP
- THREDDS
- WEB SERVICES
- ESI
- ECHO ORDERS
- WCS
- WMS
- SOFTWARE PACKAGE
- TOOL
- WEB PORTAL
- International Web Portal
- MODEL
- NOT PROVIDED

2.4 Service/Version

Care should be taken to list the version of the service, software, or tool for which the UMM-S record is being written. This element is not meant to hold the version of any associated collections. This element is required, and if the version is unknown or not applicable, the element should be populated with NOT PROVIDED.

2.5 Service/Description

The Service/Description element should provide a brief summary of the web service API, the software product, or online tool for which the UMM-S record is being created. A brief reference to the data being served by a web service API may also be warranted. However, it is best that any detailed data descriptions be provided in the UMM-C Collection/Abstract element; the UMM-C and UMM-S concept IDs can then be associated via the [CMR API](#) or the [MMT](#).

At a minimum, the Service/Description element should answer the following questions:

- Does the record describe a web service that a user will interact with via an API? Does it describe a software that user must download locally and install? Does it describe a web tool that user will interact with online?

- What are the capabilities of the service, software, or tool?
- What is the intended use of the service, software, or tool?
- Are there any limitations to what the service can provide? When should a user opt to download the data locally rather than accessing it via the service?
- Would the user benefit from understanding any unique terminology before attempting to access and use the service, software, or tool?

2.6 Service/RelatedURLs

OGC Persistent Names

OGC provides persistent names for resources of interest in geographic information infrastructures. Authors of UMM-S records for OGC web services may consider providing the corresponding specification element name as a related URL. The OGC name syntax is `http://opengis.net/spec/{standard}/{version}`. Examples are included in the table below. More information about the naming of OGC specification elements can be found [here](#).

WMS 1.3.0	{ "URL": "http://opengis.net/spec/wms/1.3", "Description": "OpenGIS Web Map Server Implementation Specification, Version 1.3.0", "URLContentType": "PublicationURL", "Type": "VIEW RELATED INFORMATION", "Subtype": "REQUIREMENTS AND DESIGN" }
WFS 1.1.0	{ "URL": "http://opengis.net/spec/wfs/1.1", "Description": "Web Feature Service Implementation Specification, Version 1.1.0", "URLContentType": "PublicationURL", "Type": "VIEW RELATED INFORMATION", "Subtype": "REQUIREMENTS AND DESIGN" }
WCS 1.0.0	{ "URL": "http://opengis.net/spec/wcs/1.0", "Description": "Web Coverage Service (WCS), Version 1.0.0", "URLContentType": "PublicationURL", "Type": "VIEW RELATED INFORMATION", "Subtype": "REQUIREMENTS AND DESIGN" }

We recommend the URLContentType, Type, Subtype, be listed as PublicationURL, VIEW RELATED INFORMATION, and REQUIREMENTS AND DESIGN, respectively. This is because the OGC names point to publications describing the requirements and design of the web service implementation.

Duplication of RelatedURLs Across UMM Profiles

Duplication of URLs across the UMM profiles should be kept to a minimum. For example, it is not necessary for dataset user guides, ATBDs, and landing pages to be listed in a UMM-S record if that record is to be associated with a UMM-C record already containing such URLs. URLs that are specific to the service, such as a service user guide or FAQ page, should be included in the UMM-S RelatedURLs class.

2.7 Service/Platforms

Efforts should be made to maintain consistent platform and instrument information across UMM profiles. For example, if a UMM-C record contains two platforms, an associated UMM-S record for a web service should include one or both of those platforms, as appropriate.

2.8 Service/ScienceKeywords

Metadata authors should strive to ensure science keywords are relevant to the data served by the service. Where appropriate, science keywords should be consistent with any associated collections.

2.9 Service/ServiceKeywords

The EARTH SCIENCE SERVICES keywords are fairly limited in scope. Only those keyword hierarchies with a category of EARTH SCIENCE SERVICES are valid for these elements. The use of Service/Ancillary keywords is highly recommend to more fully describe the unique capabilities of a service, software, or tool.

2.10 Service/ServiceOrganizations

Efforts should be made to maintain consistent contact information across UMM profiles. For example, if the GES DISC HELP DESK SUPPORT GROUP contact information is to be listed as a Service/ServiceOrganizations/ContactGroups entry in UMM-S, the information should be consistent with the Collection/DataCenters/ContactGroups entry in UMM-C.

Should a change be made to any contact information, the change should be applied to all instances across UMM profiles.

2.11 Service/ContactPersons

The Service/ContactPersons class is independent of the ContactPersons class nested within ServiceOrganizations. The Service/ContactPersons class should be used to document how a user can contact a specific person with expertise in the service, software, or tool for which the UMM-S record is being created. The person may or may not be affiliated with a service organization.

2.12 Service/ContactGroups

The Service/ContactGroups class is independent of the ContactGroups class nested within ServiceOrganizations. The Service/ContactGroups class should be used to document how a

user can contact a specific group with expertise in the service, software, or tool for which the UMM-S record is being created. The group may or may not be affiliated with a service organization.

Appendix A Abbreviations and Acronyms

API	Application Programming Interface
ATBD	Algorithm Theoretical Basis Document
CMR	Common Metadata Repository
DAAC	Distributed Active Archive Center
EOSDIS	Earth Observing System Data and Information System
ESDIS	Earth Science Data and Information System
ESI	EOSDIS Service Interface
FAQ	Frequently Asked Questions
GCMD	Global Change Master Directory
IMPACT	Interagency Implementation and Advanced Concepts
KMS	Keyword Management System
MMT	Metadata Management Tool
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
OGC	Open Geospatial Consortium
OPeNDAP	Open-source Project for a Network Data Access Protocol
SE TIM	Systems Engineering Technical Interchange Meeting
THREDDS	Thematic Real-time Environmental Distributed Data Services
UMM	Unified Metadata Model
UMM-C	Unified Metadata Model for Collections
UMM-S	Unified Metadata Model for Services
UMM-Var	Unified Metadata Model for Variables
URL	Uniform Resource Locator
WCS	Open Geospatial Consortium Web Coverage Service
WFS	Open Geospatial Consortium Web Feature Service
WMS	Open Geospatial Consortium Web Map Service